S011
A5A11
71

APPLIED FORESTRY NOTES

----------0---------

NORTHERN ROCKY MOUNTAIN
FOREST AND RANGE EXPERIMENT STATION
and
COOPERATING AGENCIES

No. 71 July, 1935 Missoula, Montana

CATTLE PRODUCTION COSTS ARE INCREASED BY OVERGRAZING

LIBRARY
JAN 23 1963
ROCKY MOUNTAIN STATION

Leon C. Hurtt, Senior Range Examiner

That overgrazing significantly increases the cost of producing range cattle in comparison with lighter range use is shown by preliminary results from a grazing experiment at the U. S. Range Livestock Experiment Station near Miles City, Montana. This experiment was started in 1932 by the Forest Service in cooperation with the Bureau of Animal Industry and the State of Montana to measure effects on the cattle, as well as on the vegetation of grazing yearlong ranges at three contrasting intensities of use. The area is quite typical of short grass ranges of eastern Montana, but previous to the experiment had been grazed more lightly and as a result, was in better condition than average. Both summer and winter pastures are included, the former are grazed from about May 15 to November 15, and winter pastures for the remaining six months of the year. One set of these pastures is overgrazed by about 25 percent, one set is moderately grazed to leave a substantial amount of the less desirable forage, while the third set is lightly grazed so that about 25 percent of even the choice forage growth is left at the end of the grazing period, all based on a normal season.

Results of Varying Degrees of Grazing on the Forage

Records of a detailed nature from more than 75 quadrats, clipped and other sample plots, showed a reduction of 28 percent in density of vegetation in 1934 as compared to 1933. This reduction during these first two years was not

significantly greater for overgrazed than for moderately grazed pastures. The full effects of the 1934 drought were not reflected by records taken that year mainly during June and July. A large additional reduction, especially in gramma and buffalo density, is appearing in records now being taken, but these 1935 data have not yet been summarized.

Volume of forage produced in 1934 was reduced very much more drastically than was density. Based on clipped plots and other indicators, this range produced only approximately one-fourth the normal volume. The dry fall of 1933 was followed in 1934 by the worst drought of record when the precipitation at Miles City amounted to only 5.51 inches, just 40 percent of the 13.79 inches normal. This drought and feed shortage forced 60 to 80 percent of the livestock out of southeastern Montana at ruinous prices.

It is of interest to record for comparison the reductions caused by the 1934 drought in Bureau of Animal Industry range livestock at the Experiment Station. Twenty-five yearling heifers, originally scheduled for replacement of older cows, were sold; also, 173 yearling and two-year-old steers, including some spayed heifers, all of which would have been kept one or two more seasons except for the drought. The usual number of breeding cows and practically all the 1934 steer and heifer calves were also kept, but the Station sheep were reduced by approximately 25 percent and light range horses by ten percent. Sold animals brought prices substantially higher than those paid under the drought relief program. The total reduction on experiment station ranges was less than 20 percent. The remaining 80 percent of normal numbers were wintered with very small losses with a small amount of cottonseed cake during calving, plus a reserve of hay and range forage built up through a policy of conservative stocking during more normal years. This contrasts sharply with much heavier forced reductions on surrounding overgrazed ranges.

Results of Overgrazing on Sixty Experimental Cows

The feed cost and weight records for experimental cows and their calves have responded most strikingly to the three intensities of grazing and to the drought. When this project started, 60 two-year-old, pure-bred Hereford cows were carefully selected for the experiment. Twenty of these cows were placed on pastures to be overgrazed Lot 1; 20 on pastures to be moderately grazed Lot 2; and 20 on pastures to be lightly grazed Lot 3. At the beginning of the experiment, there was less than eight pounds variation in the average weight of cows in these three lots. During most of the intervening time, the cows on overgrazed range have been 40 or more pounds lighter than the average for the other two lots, with the difference amounting to 90 pounds at the end of the relatively normal 1933 summer season.

Until July 20, 1934, each of the three lots of cows had exactly the same care, watered at the same wells, and had the same supplemental winter feed so that the difference in grazing intensity was the only variable. Due to the drought, the forage at that time was practically exhausted on the overgrazed pastures and supplemental feeding of hay was necessary to prevent starvation losses of cows in Lot 1. As the drought continued and the hope for fall rains faded, hay feeding was required on September 5 for the Lot 2 cows on moderately grazed range, and on September 14 for those on Lot 3 on lightly grazed ranges. All cows were moved to feed lots in November, but were returned to their pastures for calving on April 2, 1935.

With the exception of this November to April period of 4-1/2 months during the winter of 1934-35, the cows were never off their range pastures from July, 1932, to the present.

During the winters of 1932-33 and 1933-34, supplemental hay amounting uniformly to an average of 430 pounds was fed during 28 days the first winter and 170 pounds during 18 days of the second winter, or an average of 600 pounds for two winters, inclusive. Otherwise, the cows have subsisted entirely on range forage, water, salt and bone meal up until last July when the drought necessitated summer feeding, as already explained.

A Six-Weeks' Range Breeding Practice Followed

Uniform bulls from the same sire have been used in the range pastures at the rate of one bull for ten cows for six weeks each season, beginning about July 4. Yearling bulls have now been satisfactorily used during two seasons, but two-year-olds were used in 1933. The cows are now five years old and their third calf crop amounted to 60 percent for cows on overgrazed pastures and 75 percent for each of the other two lots on moderately and lightly used pastures. Data for this 1935 calf crop are not included in the following tabulation.

A summary of data for two years on calf crop and weights, supplemental feed used and certain cost figures for these 60 cows grazed, as already described, follows.

The following points are noteworthy from a detailed comparison by lots of calf weights during the two seasons: (1) the lighter average birth and weaning weight of calves on overgrazed range; (2) the nearly parallel trend in weight for calves on moderately and lightly grazed pastures; (3) the increasing divergence in weight, as the season advanced, of the calves from overgrazed as compared to those from moderately and lightly grazed ranges; (4) the calf weights during the

COMPARATIVE CALF CROPS AND CALF WEIGHTS FOR THREE INTENSITIES OF GRAZING DURING 1933 AND 1934

	Twenty (20) Cows in Lot 1 Overgrazed Range	Twenty (20) Cows in Lot 2 Moderately Grazed Range	Twenty (20) Cows in Lot 3 Lightly Grazed Range
No. live calves born, two years	30	39	32
Percent calf crop, ave. two years	75%	97½%	80%
Weight of calves at birth, average two years	68.4#	74.9#	71.5#
Weight of calves at weaning, average two years	(30)° 263.4#	(37)° 300.7#	(31)° 309.2#
Weaning weight, prorated to 20 cows, average two years	197.6#	278.1#	239.6#

°Number of calves at weaning time for two years in parenthesis.

- - - - - - - -

COMPARATIVE AMOUNT AND COST° OF RANGE AND HAY USED PER POUND OF CALF WEIGHT PRODUCED DURING TWO YEARS.

	Lot 1 - Overgrazed Range	Lot 2 - Moderately Grazed Range	Lot 3 - Lightly Grazed Range
Average range acres per cow	23.1	30.5	38.8
Pounds hay fed winter 1932-33	430	430	430
Pounds hay fed winter 1933-34	170	170	170
Average hay per cow, two winters	300	300	300
Pounds hay summer 1933	None	None	None
Pounds hay summer 1934 (drought)	2027	1267	848
Cost of hay and range per pound of calf weight produced 1933	1.52¢	1.57¢	2.32¢
Cost of hay and range per pound of calf weight produced 1934	8.5¢	3.5¢	3.9¢
Weighted average cost per pound, two-year	3.84¢	2.44¢	2.83¢

° An $8 instead of the prevailing drought price of $20 per ton for baled hay and of 10¢ rental per acre for range is used above. The actual period is from December 1, 1932, to October 18, 1934, six weeks short of two full years because of the drought.

1934 drought from moderately and lightly used ranges were heavier up to about September 1, than at a corresponding date in 1933, while those from overgrazed range averaged much lighter even with the benefit of supplemental hay beginning in July, 1934. There was a feed reserve from the previous year on moderately and lightly grazed ranges, but not on the overgrazed ranges.

Summary and Preliminary Conclusions

Hay and range forage used are the variable factors and are included in the above cost data, but other costs that are uniform for the three lots are not included.

The average calf crop for two years was thus 75 percent, 97-1/2 percent, and 80 percent, respectively, for overgrazed, moderately grazed, and lightly grazed pastures. Including the 1935 record, the three-year calf crop averages become 70 percent, 90 percent, and 78 percent, respectively. The average calf weaning weight prorated to the total number of cows grazed was 197.6, 278.1, and 239.6 from overgrazed, moderately grazed, and lightly grazed pastures, respectively.

With hay figured at $8 per ton and range forage at a ten-cent per acre annual rental, the per pound cost of weaning calf weight produced on overgrazed range pastures was 1.4 cents or 57 percent higher than on moderately, and 1.0 cents or 37 percent higher than on lightly used range. Taking the drought year only, the cost per pound of calf production was 8.5 cents, 3.5 cents and 3.9 cents, respectively. Thus, the cost on overgrazed range was more than double the per pound cost on either moderately or lightly used ranges during the 1934 drought year. Bear in mind that this penalty in increased cost of production was effective before the range vegetation was materially damaged by overgrazing. The spread may be expected to increase as the overgrazed pastures decline under continued overgrazing. The need for conservative grazing to build up a reserve of range forage for use to keep costs down during drought years is thus strikingly emphasized.

Overgrazing causes increased depreciation of breeding cows, reduces the calf crop, increases the expense for supplemental feed, and thus greatly increases the cost of gains. An ample range allowance is cheaper than hay. Overgrazing also tends toward overproduction and to serious demoralization of finances and of established breeding herds during droughts and other emergencies. Conservative grazing, on the other hand, not only minimizes or avoids these difficulties, but preserves the range resources.